

ITS TRUCK ACTIVITIES

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UNITED STATES DEPARTMENT OF TRANSPORTATION

ITS Research = Multimodal and Connected

- To Improve Safety, Mobility and Environment
- Research of technologies and applications that use wireless Vehicles communications to provide and connectivity: Fleets
 - Among vehicles of all types
 - Between vehicles and roadway infrastructure
 - Among vehicles, infrastructure and wireless consumer devices

FCC Allocated Spectrum at 5.9 GHz for Transportation Safety (known as DSRC)

Drivers/Operator

Rail



Wireless Devices

Infrastructure



UNITED STATES DEPARTMENT OF TRANSPORTATION

Major Objectives:

- Move aggressively on vehicle to vehicle communications
 - Regulatory Decision on In-Vehicle Equipment by 2013 (cars) and 2014 (trucks)
- Accelerate in-vehicle technology
 - Basic Safety Messaging
 - Aftermarket Safety Systems
 - Enables safety and active traffic management
- Accelerate infrastructure communications capability
 - Signal Phase and Timing (SPaT) as initial focus
 - Enables safety, mobility, and environmental applications
- Multi-modal pilot deployments for high-value applications
- Monitor and evaluate driver distraction issues
- Understand data and communications needs (DSRC/other) of transformative mobility applications – and the potential benefits of these applications



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ITS Research Program Components

Applications

Safety		Mobility		Environment		
V2V	V2I	Safety Pilot	Real Time Data Capture & Management	Dynamic Mobility Applications	AERIS	Road Weather Applications

Technology

Harmonization of International Standards & Architecture

Human Factors

Systems Engineering

Certification

Test Environments

Policy

Deployment Scenarios

Financing & Investment Models

Operations & Governance

Institutional Issues

USDOT TRUCK ITS Research Plan for Wireless Connectivity – Final 7-27-11



OVERVIEW of PROJECTS

Connected Commercial Vehicle

Smart Roadside

• FRATIS



Connected Commercial Vehicles



Trucks and V2V/Safety Pilot -Connected Commercial Vehicle (CCV) Safety Applications

OVERVIEW

- Safety Pilot Model Deployment
 - 3 Fully Integrated Tractors
 - 16 Retrofit Safety Device Kits (2 Teams)
- Vehicle to Vehicle (V2V) Applications
 - Forward Collision Warning
 - Electronic Emergency Brake Light (EEBL)
 - Blind Spot Warning/ Lane Change Assist
 - Intersection Movement Assist
- Vehicle to Infrastructure (V2I) Applications
 - Curve Overspeed Warning
 - Bridge Height Inform





CCV Safety Applications Project: Motivation

- According to the 2009 Large Truck Crash Overview
 - large trucks accounted for 10% of all vehicle miles traveled and 4% of all registered vehicles in the United States
 - In motor vehicle crashes, large trucks represented:
 - 7% of vehicles in fatal crashes, 2% of vehicles in injury crashes, 3% of vehicles in property-damage-only crashes.
 - In 75% of the fatal crashes and 67% of the nonfatal crashes involving large trucks, the first harmful event was a collision with another vehicle in transport.
 - In two-vehicle fatal rear-end crashes, passenger vehicles struck large trucks in the rear approximately four times more often than large trucks struck passenger vehicles in the rear—17% versus 4%.
- Connected Vehicle Technology can help overcome driver distraction, obstructed/limited visibility due to weather or other vehicles, and driver judgment errors that contribute to large truck crashes.



CCV Safety Applications Project: Purpose

- Support USDOT Safety Pilot objectives for commercial vehicles including:
 - Demonstrate V2V and V2I safety-related applications in a realworld environment
 - Collect V2V safety benefits data to support NHTSA 2014 agency decision process for commercial vehicle implementation
 - Evaluate the scalability, security, and interoperability of DSRC devices
 - Collect data for later use by other researchers
- Commercial vehicle specific results will be shared with the commercial vehicle community



CCV Safety Applications Project: Objectives

- Integrate wireless DSRC technology into selected commercial vehicles
- Develop and demonstrate research prototypes of vehicle-to-vehicle crash avoidance safety applications on commercial vehicles:
 - Emergency Electronic Brake Light, Forward Collision Warning, Lane Change Assist, Intersection Movement Assist
- Develop and demonstrate research examples of vehicle-to-infrastructure safety applications:
 - Curve Over-speed Warning, Bridge Height Inform
- Instrument the trucks with onboard Data Acquisition Systems to collect safety and performance data
- Support vehicles in connected vehicle research and testing activities including
 - Application Interoperability and Performance Testing by the USDOT
 - Driver Acceptance Clinics by the Project Team
 - Model Deployment of Safety Applications by the Safety Pilot Conductor
 - Application Objective Testing by USDOT



CCV Safety Applications Project: Team

- Multi-Modal USDOT Contract and Advisory Team
 - ITS Joint Program Office
 - National Highway Traffic Safety Administration
 - Federal Motor Carrier Safety Administration
 - Federal Highway Administration
- Project Team
 - Battelle
 - Program Manager and Driver Clinic Conductor
 - Mercedes Benz Research and Development North America (MBRDNA)
 - Connected Vehicle Safety Applications Developer
 - DENSO INTERNATIONAL North America Research Laboratory (NARL)
 - Onboard Equipment Platform and Wireless Communications Supplier
 - University of Michigan Transportation Research Institute (UMTRI)
 - Data Acquisition System Provider and Performance Testing Evaluator
 - Meritor WABCO
 - Commercial Vehicle Crash Avoidance Systems Supplier
 - Daimler Trucks North America (DTNA) Advanced Engineering NAFTA
 - Heavy Truck OEM and CAN Integration Support



CCV Safety Applications Project: Driver Acceptance Clinic Overview

Objective

- Evaluate Driver Acceptance of V2V applications
 - Surveys and direct observation of driver responses to warnings
 - Drivers with valid CDL in good health
- System Performance Tests
- Coordinated with the Small Vehicle Clinics and Volpe Independent Evaluator



Site 1 Transportation Research Center & Proving Ground East Liberty, Ohio





Connected Commercial Vehicles – Retrofit Safety Devices

•Commercial Vehicle Retrofit Safety Device (RSD) -

- Objectives: Create RSD's for testing and participation in Safety Pilot. RSD kits are being developed with V2V safety applications for retrofitting on fleet vehicles in the Model Deployment. This will provide additional data necessary by adding more trucks with V2V systems for the 2014 NHTSA Decision.
- Two awards from same procurement
 - Battelle teamed with Denso, Meritor WABCO, Mercedes, Daimler Trucks and UMTRI
 - Cambridge Systematics teamed with Southwest Research Institute and Volvo
- 16 trucks will be fitted with RSDs for Model Deployment (8 from each team)
 - Battelle RSD applications FCW, BSW, IMA, EEBL, CSW
 - Cambridge RSD applications FCW, EEBL, CSW
- Project Accomplishments to date
 - Developed Self-certification Test Plans
 - Created Architecture and Design Specifications
- Planned accomplishments
 - Both teams are on schedule to deliver RSDs for Model Deployment



CCV Safety Applications Project: Status Update

- Hardware installation completed on Integrated Trucks
- Base applications development completed
- Integrated tractors participated in Safety Pilot interoperability testing with CAMP vehicles, Aftermarket Safety Devices and Vehicle Awareness Devices
- Driver Acceptance Clinics conducted at TRC (Ohio) in July (TRC) and in Alameda California in August
- Integrated Trucks in Safety Pilot Model Deployment, Retrofit Safety Device Trucks by end of September





Connected Commercial Vehicles – Safety Pilot Related Activities

- Objective Test Development
 - Awarded to NHTSA's Vehicle Research Test Center East Liberty, OH March 2012
 - Project runs through March 2013
 - Develop objective test procedures to evaluate heavy truck V2V systems
 - Evaluate RSD kits installation and functionality before they go UMTRI for installation on fleet vehicles in Model Deployment
- Independent Evaluation for Trucks in Safety Pilot
 - Awarded to Volpe in March 2012
 - Task to analyze truck data (both integrated and RSD) from Safety Pilot
 - Calculate safety benefits and conduct analysis to support 2014 NHTSA Decision



Smart Roadside



What if.....

- Compliant carriers could not only bypass inspection stations, but could achieve higher safety ratings by doing so?
- Carriers could receive real time notification about compliance issues with their drivers and vehicles?
- Drivers could receive information on the availability of parking along their route?



Smart Roadside

- Wireless Roadside Inspection Program
- Universal Identification
- Electronic Screening/Virtual Weigh Stations
- Truck Parking Program



Smart Roadside

- Partnership between FMCSA and FHWA to enhance truck enforcement activities and increase mobility
- 2008 Smart Roadside Workshop
 - Commercial vehicle safety, security and mobility systems should be linked into a coordinated roadside program.
- Keys to Smart Roadside Initiative Success
 - Interoperable technologies and information sharing between in-vehicle, government office systems, and carrier office systems.
 - Leverage stakeholders' current technology investments in order to augment existing programs and support new activities.



Smart Roadside Vision

- Highway facilities and key nodes on the freight system (ports and terminals, international border crossings, toll plazas, weigh stations, and other check points) share data in order to:
 - Focus enforcement resources on high-risk carriers, vehicles, and drivers
 - Manage the flow of commercial vehicle traffic
 - Help prevent crashes and other incidents
 - Reduce unnecessary delay for commercial vehicles, and thereby improve associated energy consumption and emissions



Smart Roadside Scope



Trucks and Vehicle-2-Infrastructure Smart Roadside Summary

<u>Smart Roadside Initiative</u>

- **Objectives**: To identify and integrate truck-specific roadside technology, developing a Concept of Operations , and testing prototype(s) of Smart Roadside Applications.
- Awarded to SAIC, project team comprised of:
 - North Dakota State's Upper Great Plains Transportation Institute (UGPTI)
 - American Transportation Research Institute (ATRI)
 - Delcan Corporation
 - Commercial Vehicle Safety Alliance (CVSA)
- Applications include:
 - Wireless Roadside Inspections
 - Universal Truck Identification
 - Virtual Weigh Station/Electronic Screening
 - Truck Parking Programs
- Project Accomplishments to date
 - Project and systems engineering management plans
 - Applications analysis and assessments of deployed systems
 - Applications analysis and assessments of research projects
 - Concept of Operations stakeholder walkthroughs
- Planned accomplishments
 - Complete Concept of Operations
 - Prototype Testing development underway
 - · Award Benefits and Experimental Test Design/Build up projects



FRATIS



Dynamic Mobility Program



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U.S. Department of Transportation

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FRATIS - BACKGROUND

DMA Freight Problem Statement: Lack of Advanced Traveler Information has negative effect on

- Efficient Movement of Freight Transportation
- Logistics Management Systems
- Environment of Neighboring Communities
- Energy Consumption
- Safety of the Traveling Public
- DMA Proposed Freight Solution: Develop Freight Advanced Traveler Information (FRATIS) applications focusing on
 - Freight Real-time Traveler Information
 - Freight Dynamic Route Guidance
 - Drayage Optimization





Data are based on preliminary qualitative findings collected during baseline activities along the target supply chain. U.S. Department of Transportation

Transition \rightarrow C-TIP Applications to FRATIS

Electronic Freight Management Initiative

C-TIP - Intermodal Exchange (IMEX), Wireless Drayage Updating (WDU), Real Time Traffic Monitoring (RTTM), Dynamic Route Guidance (DRG)

- Scalable and Transferable
 - Rail-to-rail: cross-continental moves
 - Port-to-rail: where on-dock rail facilities do not exist
 - Port-to-truck: port to distribution centers
 - *Airport-to-truck: airport to distribution centers*
 - Over the road freight movements



Freight Real-Time Traveler Information

Problem Addressed

 Uncertainties in traffic congestion and weather conditions pose a productivity and safety risks to freight traffic

Description

- Road Weather Information
- Truck Parking
- Truck Scales
- Permitting
- Road Construction
- Bridge Clearance
- Bridge Weight Formulas
- Travel Time Metrics



Freight Dynamic Route Guidance

- Problem Addressed:
 - Lack of awareness of the best routes along congested corridors result in increased delays and costs to freight traffic
- Description
 - Road Construction
 - Traffic Congestion
 - Predicted Travel Times
 - Freight Traveler Specific
 - Build on the C-TIP Real Time Traffic Monitoring (RTTM) and Dynamic Route Guidance (DRG) applications for best route between freight facilities



Drayage Optimization

- Problem Addressed
 - Reduce freight delays to ensure uninterrupted operations within the terminal/warehouse

Description

- Optimize drayage operations so that load movements are coordinated between freight facilities
- Maximize Loaded Trips and Minimize Empty Trips
- Port and Intermodal Gate Processing Information



iPhone / Android Applications Systems built to avoid DRIVER DISTRATION



FRATIS Operating Scenario

FRATIS Components

> Intermodal Exchange (IMEX)

Wireless Drayage Updating (WDU)

Real Time Traffic Monitoring (RTTM)

Dynamic Route Guidance (DRG)





Trucks and Mobility

- Dynamic Mobility Freight Advanced Traveler Information (FRATIS) -
- Objective: One of the DMA Mobility Bundles, and is looking to specifically address the concept development and needs refinement for a related collection (bundle) of Freight related high-priority applications, collectively identified as Freight Advanced Traveler Information System (FRATIS).
- Awarded to Cambridge Systematics
 - · Con Ops development and Functional Requirements of the following freight applications:
 - Freight Real-Time Traveler Information with Performance Measures
 - Drayage Optimization
 - Freight Dynamic Route Guidance
- Project Accomplishments to date
 - Captured User Requirements 3/1/2012
 - Final ConOps 3/30/2012
 - Completed assessment of transformative benefits 4/16/2012
 - Assessment of Relevant Prior and Ongoing Research 4/30/2012
 - Final Functional Requirements 4/30/2012
- Planned accomplishments
 - Final Report on Test Readiness Assessment 5/30/2012
 - Award proto-type testing project(s) 7/1/2012



One more Truck item.....

Multistate Corridor Operations and Management Awards



Multistate Corridor Operations and Management Awards

Project	Description	Funding
Great Northern Corridor (MT, ID, MN,ND)	Multistate Planning and Development Study	\$300K
Wisconsin DOT (IL, IN, MN, WI, Ontario, CN)	Work Zone and Traveler Information across Corridor using an innovative, regional planning process	\$900K
North/West Passage Corridor Coalition (WA, ID, MT, WY, ND, SD, MN)	Rural empahsis on multi-corridor traveler information	\$800K
West Coast Corridor Clean, Green and Smart		
Corridor Development (AL, WA, OR, CA)	Alternative Fuel study across a corridor	\$400K
	Multi-modal real time travel dissemination	
I-15 Mobility Alliance (NV, UT, CA)	using GPS and focused on rural setting	\$1.5M



FOR MORE INFORMATION

www.its.dot.gov

Imagine that

...a car a mile ahead of you on the highway sends an alert to your vehicle, warning you of upcoming slippery conditions that are causing drivers to slam on their brakes.

U.S. DOT will host Free Public Meeting and Webinar for the Integrated Dynamic Transit Operations (IDTO)

The IDTO public meeting will bring stakeholders together as part of an interactive forum. Read more...

- ITS Architecture Made Easier Using Turbo Architecture: An Overview of NHI's New Webbased Turbo Architecture Course 1/10/12
- U.S. DOT Announces Public Meeting for Two Connected Vehicle Concepts for Traffic Management 1/9/12
- Letter from the Director Congratulating ITS JPO Staff Award Winners 12/23/11

More News>>

Spotlight

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- Real-Time Data Capture
- Dynamic Mobility Applications
- Environment
- Road Weather

More >>



Procurement Opportunities

As we implement the ITS Research Strategic Plan, open procurements may become available through a variety of solicitations. More >>





